AUGUST 1966
VOL. 32 NO. 1

Soil Conservation

DEVOTED TO THE WISE USE OF
LAND AND WATER RESOURCES

NONFARM USES OF SOIL SURVEYS

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SOIL CONSERVATION SERVICE
U. S. DEPARTMENT OF AGRICULTURE

32 Years . . .

This issue begins the 32d year of publication of *Soil Conservation.*

Appropriately, we devote much of it to one of the newest and most significant developments in conservation technology—the use of soils information in nonfarm uses of the land.

Payoff: To tell this story, we called on soils men in field stations to report examples from their experience.

From the myriad of case histories, Soil Interpretation Director A. A. Klingebiel was able to express results in terms of cost-benefit ratios for different intensities of land use (p. 3).

These figures vary widely, of course, for specific cases, but it's the exceptional survey that doesn't *pay for itself in 1 year.*

Many promise to return benefits worth 100, 200, or more, times the cost in the 25-or-so years of their usefulness.

First Principle: Three decades ago, SCS launched its operations on the principle that every land use and conservation decision should be based on a physical inventory of the area to be treated; i.e., a soil survey.

SCS has never deviated from that principle. In the many expanding programs since, other data have been needed too, but always the soil survey was basic.

The growing demands of urban developments are no exception.

COVER: A soil scientist in a typical pose, resting his map case on his auger as he draws the boundaries his trained eye sees in the landscape before him, in the Alleghany Soil and Water Conservation District, N. C.

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ORVILLE L. FREEMAN — Secretary of Agriculture
JOHN A. BAKER — Assistant Secretary of Agriculture
DONALD A. WILLIAMS — Administrator, Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service,
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BEN O. OSBORN, Editor
GEORGIE A. KELLER, Production Editor

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Costs and Returns of Soil Surveys

SEWAGE SYSTEM, Massachusetts: ***The town of Cohasset saved more than $250,000 on its sewage system by using information from an SCS soil survey. The survey showed that less than 1 percent of the town area was suitable for onsite sewage disposal.***

SCHOOL GROUNDS, Virginia: ***Fairfax County lost $250,000 in avoidable costs when it selected a school site without using a soil survey. Another site only 500 feet away had favorable soils, according to the survey.***

FARMLAND, Tennessee: ***A farmer in Fayette County increased his income more than $5,500 in 1 year alone. He studied a soil survey of his farm and made some adjustments in land use.***

WATER MAIN, Michigan: ***A town near Detroit is out $200,000 because its new water main was constructed across a 600-foot-wide area of deep peat. A soil survey could have indicated another route over normal mineral soils.***

WATER MANAGEMENT, Nebraska: ***Farmers in Hall County added from $5 to $150 an acre to their income by an improved water management system and reclamation of saline and alkali soils. The changes resulted from use of a soil survey in their area.***

RESIDENCES, Virginia: ***More than 100 homes in the suburbs of Richmond were flooded, resulting in several hundred thousand dollars worth of damage. This happened 2 years in a row. A soil survey would have spotlighted this hazard.***

Wide range of uses result in benefits that repay entire cost in first year

By A. A. Klingebiel,
Director, Soil Survey Interpretation, SCS

A SOIL SURVEY is an investment that is almost certain to pay for itself—and return a profit—within a year.

Figures on the costs of making surveys and the benefits derived from using them translate into cost-benefit ratios of the order of 1 to 45 and upwards for a survey that will be useful for at least 25 years. This indicates a minimum of nearly $2 of return *the first year* for each dollar spent for the entire cost of the survey.

Summarized in three groups according to the intensity of the land use in the areas surveyed, the following average cost-benefit ratios resulted:

Low intensity areas—predominantly range and woodland—1 to 46.

Medium intensity areas—mixed agriculture, about half cropland—1 to 61.

High intensity areas—fringes of rapidly growing metropolitan areas, about a fourth urbanized—1 to 123.

The intensity of the surveys themselves varies with the intensity of the land use pattern for which they are to be used. It is obvious that the value of the benefits increases more rapidly than the cost of surveying as land use intensity increases.

Soil surveys were originally designed to assist farmers and ranchers, but in recent years home builders, community planners, highway engineers, and others have discovered their multiple benefits. Requests for surveys in nonfarm areas have doubled in the past 2 years and are expected to double again in the near future.

$300 million saved

As one example of nonfarm use, Dr. Kurt Bauer, executive director of the Southeastern Wisconsin Regional Planning Commission, estimates that the use of soil surveys in his 7-county area will save $300 million in the cost of residential land development alone in the next 25 years. This is based on the expectation that 300,000 new homes will be built in the area during that period.

If soil maps are *not* use, approximately half of these new homes will be built on highly unsuitable soils, requiring an extra cost of $2,000 a home to provide initial onsite sewage disposal facilities and then to replace these later with centralized public sewerage facilities. But, by using soil maps before selecting homesites, the potential reconstruction costs can be avoided.

John R. Quay, an architect and consultant in Barrington, Ill., near

Chicago, states that if current trends continue, at least $1 billion worth of private construction will go up in the six-county region each year. Mr. Quay predicts that use of soil maps will save people in that area an average of $10 million annually in private building costs alone. This is a savings of more than $1.6 million dollars a county.

Added savings in both areas can be expected if soil survey maps are used for planning highways, airports, schools, and the like.

Obviously, the costs and benefits of soil surveys vary, depending on whether the area mapped is rangeland or suburbia, and how intensively it is surveyed.

Soil Conservation Service records show that survey costs vary from about 30 to 70 cents an acre. Thus, a soil survey for a county of 700 square miles may run from about $142,000 to $280,000.

A little more than half that cost goes for field mapping and soil descriptions. The remainder is for laboratory and research work on soil classification, correlation, and interpretations, for map compilation, writing and editing the report, and publishing expenses.

Overall, the average total cost to SCS in fiscal year 1965 for surveying more than 52 million acres and publishing 37 soil surveys (about 17 million acres) was approximately 43 cents an acre.

In determining costs and benefits of soil surveys it is reasonable to assume that they will be highly useful for at least 25 years. Spread over this period, the 30- to 70-cent total cost would amount to a little more than 1 cent to about 3 cents an acre a year, depending on the intensity of the survey.

How benefits are determined

Estimates of benefits are based on case histories and records of soil survey users. The figures come from average cost and benefit figures, and the projections are based on past experience in using soil surveys. It is assumed that most people in the surveyed area, or their builders or advisers, would use the soil information.

It is assumed that farmers and ranchers benefit from soil surveys each year through improved management on the same land. For nonfarm uses, soil survey benefits are assumed only once for each acre.

In many instances, especially among nonfarm users, the benefits will come through changing their original land use plans. The assumption is that, without a soil map, the original plans would be carried out, and costly repairs often would be necessary. With the surveys, these costs would be avoided.

Nonfarm benefits

Savings to nonfarm users are estimated at $250 an acre. This is conservative when compared to benefits actually reported by many users in rapidly expanding areas.

Dr. Thomas H. Thornburn of the University of Illinois described before the 1965 annual meeting of the Soil Science Society of America how the choice of route for 10 miles of interstate highway in Ford County, Ill., could make a difference of $810,000 in construction costs.

According to the soil map, one route under consideration had a number of soils poorly suited to highway use. The other had better soils. Since the highway would be 300 feet wide, it would require 360 acres of land. The difference in excavation and construction costs between the two routes would amount to $2,250 an acre saved by using the more favorable route indicated by the soil survey.

Savings of $30,000 to $225,000 have been reported in selecting school sites after using a soil survey. Some soil, of course, has a low load-bearing quality, is subject to flooding, or unsuited for onsite sewage disposal.

Such soil, if improperly selected, can add thousands of dollars to the cost of school foundations, preparation of athletic fields, and so on. Assuming 20 acres for a school site, use of a soil map could save $1,500 to $11,250 an acre.

Irrigated land

Savings from using soil surveys on irrigated cropland are estimated as an average of $5 an acre a year. Some users, who grow high value crops, report savings as high as several hundred dollars an acre.

Soil surveys can warn against land leveling and the removal of topsoil on soils shallow to gravel or claypan. Yield reduction here could amount to $50 to $100 an acre annually.

A precise and scientific knowledge of the soil can also reduce the amount of irrigation water needed, predict the reaction of crops to different fertilizers, and indicate whether land high in toxic salts is worth reclaiming.

Nonirrigated farmland

The benefits from soil surveys on nonirrigated farmland are estimated at about $1 an acre a year on the medium and high intensity use areas and 40 cents an acre in the low intensity areas where the main crops are small grains, hay, and tame pasture. These estimates, too, are conservative when compared to benefits reported by many users.

One of the major benefits comes from selecting soils best suited for a particular crop and then applying knowledge gained on similar soils with the same crop. Surveys can also pinpoint the need for soil drainage, the kind, spacing, and depth of drains, and any necessary erosion control measures.

After years of growing corn and cotton on his hilly fields, a farmer in Fayette County, Tenn., checked a soil map for the first time. As a result, he selected another part of his farm for his crops and increased his yields three times and

Montana ranch illustrates low intensity use area made up largely of range, pasture, or woodland.

Medium intensity use—about half cropland and half pasture, woodland, and urban land—is illustrated (above) by an Ohio farming area. A Prince Georges County, Md., housing development (below) is typical of high intensity use of land near rapidly growing metropolitan areas.

his net income by more than $4,000. On 27 acres, this averages out to an increase of $128 an acre.

Many other farmers in the Southeastern tobacco-growing area report increased incomes of $200 to $300 an acre from using surveys to locate the best soils for growing tobacco.

Rangeland and woodland

On the extensive acreages of range and woodland where per-acre returns are low, benefits from use of soil surveys may amount to only 10 to 20 cents an acre annually, but individual benefits 10 times as great have often been reported. Soil maps can show where grass, shrubs, or trees will grow best and also indicate response to various range and woodland management practices.

To summarize, three typical areas, each of 700 square miles, have been described, and costs and benefits from soil surveys calculated as follows:

Low intensity use area.—Land use is about 15 percent dryland farming, 75 percent range or woodland, 5 percent irrigated farmland for general farm crops, 3 percent urban and other nonfarm uses, and 2 percent changing from farm to nonfarm use. Such an area is typical of parts of most States west of the 100th meredian.

The benefits of soil surveys, over a 25-year period, in this area are estimated at about $6.5 million. The total cost of the survey is about $142,000. Thus the cost-benefit ratio for the period comes to 1 to about 46.

In low intensity areas, it is assumed that farmers and ranchers benefit from the surveys at the rate of 40 cents an acre annually for dryland farming; $5 an acre for irrigated land; 10 cents an acre for forest, range, and recreation land; and $250 an acre for land converted from farm to nonfarm uses.

No benefits are claimed for the 3 percent of the area currently in

buildings, roads, and other nonfarm uses.

Medium intensity use area.—Such an area consists of about 48 percent cropland; 2 percent irrigated land; 42 percent pasture, range, or forest land; 4 percent in urban uses; and 4 percent now in farm use changing to nonfarm use in the next 25 years. This area is typical of commercial farming areas found in the Southern and North Central States.

Estimated benefits through use of soil surveys over a 25-year period will be approximately $12 million. The average cost of soil surveys is about $195,000. Thus, the benefit-cost ratio is 1 to about 61.

These figures assume that farmers benefit from soil surveys at the rate of $1 an acre annually for cropland; $5 an acre for irrigated land; 20 cents an acre for forest, range, and recreational land; and $250 an acre for land converted from farm to nonfarm use. No benefits are claimed for the 4 percent of land now in urban and road uses.

High intensity use area.—The land is about 35 percent commercial cropland; 15 percent forest, range, pasture, or recreational land; 23 percent used for cities, towns, and other nonfarm uses; and 27 percent changing from farm to nonfarm uses in the next 25 year. This is typical of many counties in or near rapidly growing metropolitan areas.

Surveys can prevent estimated losses of around $34 million over a 25-year period. The cost of soil surveys is approximately $280,000. The cost-benefit ratio is thus 1 to about 123.

The use of soil surveys, with proper interpretations, is the only practical way to project research data and experience from one area to another. Their small initial cost is quickly offset by the benefits, financial and other, that come from using the right soil for the right purpose. ♦

Guide for Urban Expansion

Virginia county makes soil surveys basis for zoning and building plans

By Charles J. Koch and John W. Clay
State Soil Scientist and Soil Survey Party Leader, SCS, Richmond, Va.

THE FINDINGS of "the official county soil scientist" are a routine requirement for approval of septic tank systems in Henrico County, Va., in the expanding use of soils information in areas of rapid development around the capital city of Richmond.

Henrico County, like many others in the United States, is cooperating financially with the Soil Conservation Service and the State experiment station in making the surveys. Officials of the county put the information to immediate use in zoning and public works construction.

One of the earliest uses of soils information was in the field of environmental sanitation, largely as the result of the initiative of the late Dr. B. F. Eckles, county health officer. He pioneered the use of soil maps to help find suitable lots for septic tank systems and, conversely, helped identify unsuitable locations early so that lot owners were saved from future money and health problems

A county ordinance of May 1962 made "the findings of the official county soil scientist from his examination of the soil of the land or lot of the application" a prerequisite for approval of a septic disposal system. Examinations for septic tanks are made by the sanitarian and a soil scientist.

The soil scientist makes both verbal and written recommendations to the county health department on lot limitations for septic system purposes. In addition, he prepares an interpretive colored map of prospective subdivisions based on his survey of the tract. Soils in the area are divided into four groups, depending on their desirability for septic tank use, and the map is made available to the Henrico County Planning and Zoning office.

Basis for zoning

When subdivision plans for septic systems are submitted, and the land is not suitable, approval probably will be denied. Approval may later be granted if the developer changes from a septic tank to a sanitary sewer system.

Road layouts in some proposed subdivisions may be revised so the more permeable soils can be used for septic systems. In other cases, only the portion using the right soils may be approved.

Septic system failure in Craven soil causes problems for several homeowners in a Henrico County residential development.

W. F. LaVecchia, planning administrator of Henrico County, says of the SCS soils surveys:

"We feel that your studies of proposed subdivisions, to determine their ability to take septic systems, have been of great value to this office and the developer.

"An outstanding example of the worth of soil interpretations is the case of the subdivision developer in the western part of the county who was made aware of the poor permeability of the soil within his project at an early date. He was put on notice that a sanitary sewer system would be needed instead of the septic tank systems originally planned. As a result, the developer was saved the time, effort, and money of subdividing and installing improvements on a tract of land which could not be developed with single family dwellings because the soil would not support septic tank systems.

"The extension of public sewer systems to the property was programed and the land subsequently developed to the benefit of the future homeowners, the general public, and the developer."

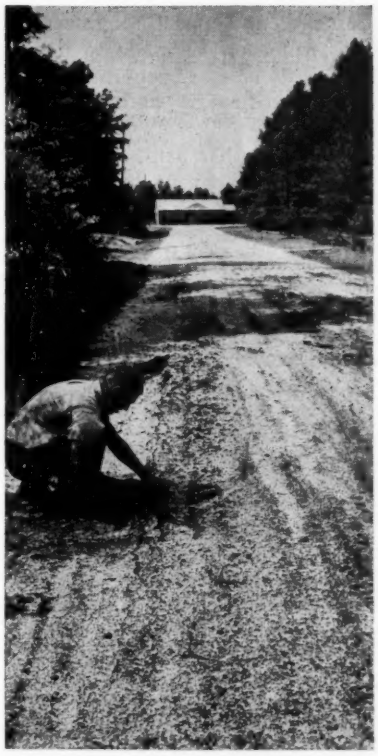
Schools use soil maps

In the last 5 years, soil investigations have been made of 13 Henrico County school sites. A number of money-saving changes resulted, according to George E. Eitel, director of school construction and maintenance.

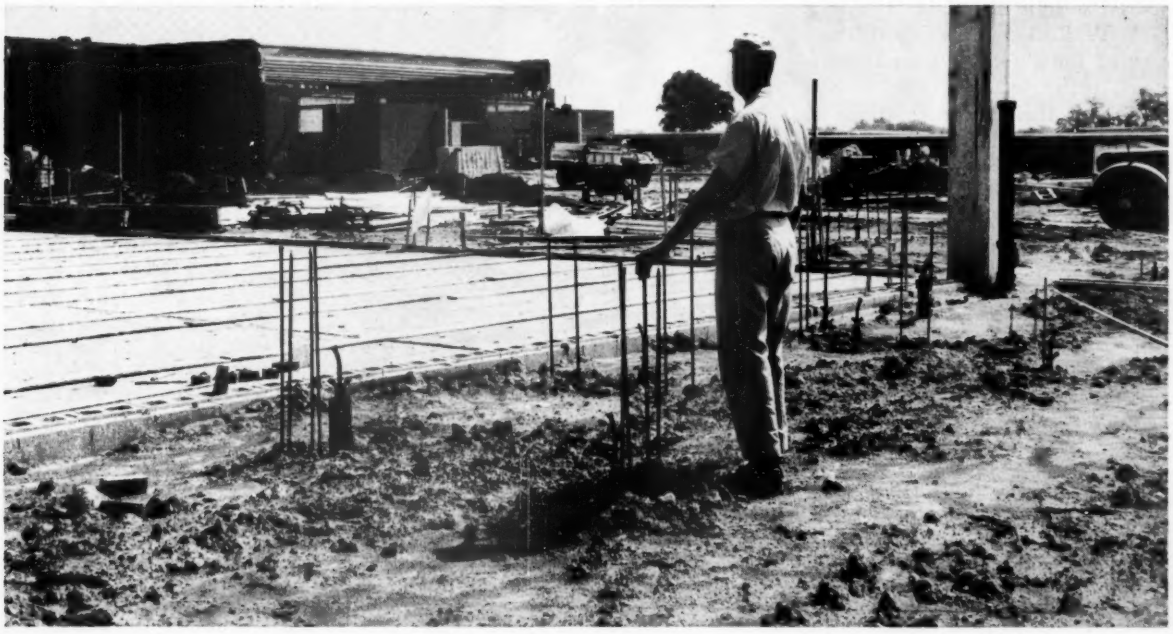
In some cases buildings were put on soils favorable for foundation stability. Some poorly suited soils were used with proper drainage facilities and land preparations for playground and parking areas. In other cases alternate sites were chosen to avoid excessive foundation and drainage costs due to high shrink-swell clays and wet seepy soils.

As one example, on the recommendation of the SCS soil scientist, the proposed location of a new school building and its adjacent road were changed. By this action, the county saved an estimated $25,000 in foundation and drainage costs and $5,000 in potential maintenance costs.

Currently, the SCS soil scientist is studying a proposed school site that is plagued with high shrink-swell clays, seepage, poor



Colfax soil with hardpan (above) caused this Henrico County pavement failure. Below, a soil scientist looks over building progress of Henrico High School. The site and exact location of the buildings were decided after a soil survey.



drainage, and rock. Engineering tests will soon be made to determine costs of site preparation and foundation design and construction.

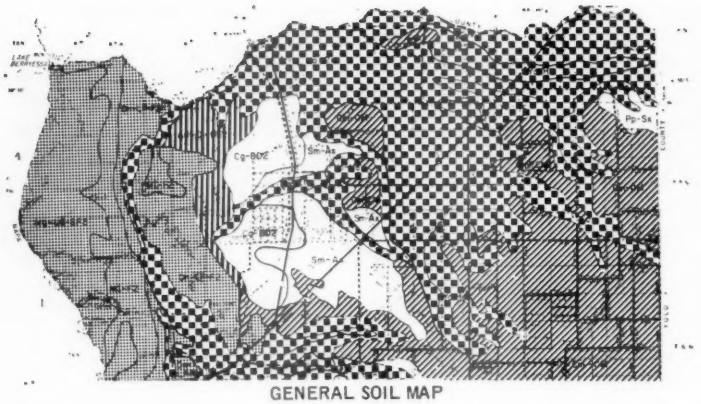
In yet another field, the County Utilities Department has received a drawing showing the soil, hardpan, and rock for more than 60 miles of water and sewer lines. The soil maps help engineers to plan utility lines so as to avoid rock when possible and to help the contractor furnish a reasonable bid by determining the amount of rock and hardpan where it does occur. The cost of excavating rock and hardpan ranges from 10 to 20 times that of a normal mineral soil.

E. L. Tarr, Jr., real property agent, says, "The Real Property Department has found it most helpful to have the services of a soil scientist available in making determinations in selections of school sites, fire station sites, sewage pumping station sites, and sewage treatment sites."

The soil survey has provided data on the engineering qualities of soils for 5 miles of road and two borrow areas for road fill. This information has resulted in improved design of roads.

P. T. Rutledge, assistant engineer of the Public Works Department, estimates that use of soil maps and their interpretations in his office has resulted in savings of $120,000 in two different road construction jobs.

The people of Henrico County are well aware of the benefits of soil surveys in building homes, sanitary systems, highways, and for other uses. Their enthusiasm and forward-looking attitude in this matter will enable them to meet future development problems. ♦



GENERAL SOIL MAP

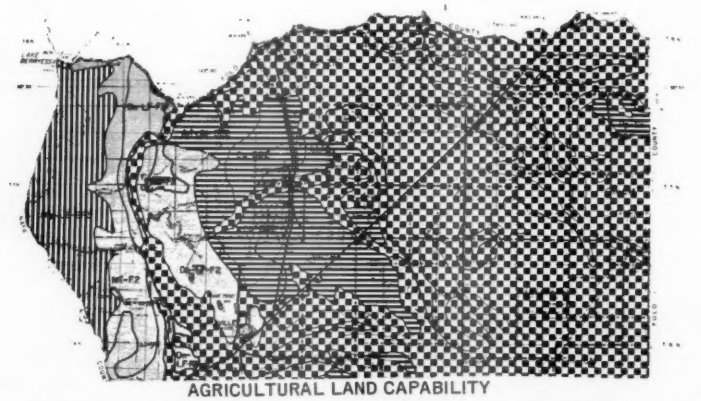
GROUP 1-Areas dominated by very deep, level, well-drained soils of alluvial fans and valleys.

GROUP 2-Areas dominated by clay soils of basins or basin rims.

GROUP 3-Areas dominated by soils with loamy surfaces and dense very slowly permeable clay subsoils.

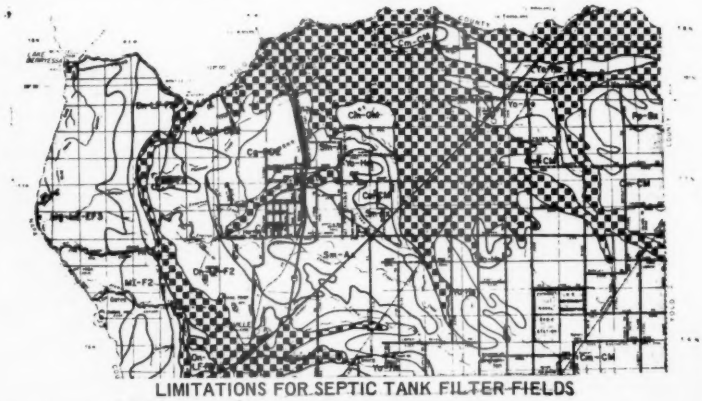
GROUP 4-Areas dominated by clay on sloping to steep hills.

GROUP 5-Areas dominated by loamy soils on uplands underlain with sandstone.



AGRICULTURAL LAND CAPABILITY

CLASSES I and II | CLASSES III and IV | CLASSES VI and VII | CLASS VIII



LIMITATIONS FOR SEPTIC TANK FILTER FIELDS

Slight | Severe

Corresponding portions of the general soil map (above) of Solano County, Calif., and two single-purpose interpretive maps. Note, for example, that group 2 soils (lower right portion of general soil map) are best for agricultural use but poorest for septic tank filter fields.

Soil Maps in Land Planning

Single-purpose interpretations help guide California's development

By Leonard R. Wohletz
State Soil Scientist, SCS, Berkeley, Calif.

SINGLE-PURPOSE interpretive soil maps made from general maps are an essential tool in long-range land use planning in California.

Countywide maps colored to show suitabilities and limitations of soils for specific purposes are being used by planning officials to guide the location of new homes, industries, transportation, and recreation areas, and to preserve open space and agricultural production, to meet the needs of California's rapidly growing population.

They are being used to help identify areas of prime agricultural land that qualify as "agricultural preserves" under the California Land Conservation Act of 1965.

The Soil Conservation Service, cooperating with soil conservation districts and associated groups, is currently compiling general and interpretive soil maps for the privately owned portions of each county in California.

The colored interpretive maps are used extensively throughout the State in meetings with the State Soil Conservation Commission, county boards of supervisors, soil conservation district directors, planning commissions, regional planning groups, and with other State and Federal resource planning agencies.

The response has been highly favorable and is creating support for completing as soon as possible both the general soil map and detailed soil maps and their interpretations for each county in the State.

Eight counties are exploring means to publish the general maps and to assist financially in accelerating the detailed mapping, interpretation, and publication. The north coastal California and the Central Lahontan Nevada-California river basin survey reports will include general and interpretive soil maps as essential elements in the presentation of land facts.

The nine counties surrounding San Francisco Bay comprise a metropolitan area of 4.5 million acres with a rapidly expanding population. People move in at an ever-faster rate, creating problems related to transportation, sanitation, recreation, and urban sprawl with the resulting loss of the remaining prime farmland.

The Association of Bay Area Governments was set up to prepare a regional plan for the solution of these problems. An element in its planning program included arrangements with the SCS, working with soil conservation districts, to prepare a general soil map and land capability interpretations for the nine Bay Area counties. The association's specific request was for soils data for regional planning, including the place of farming in the total land use pattern.

Landowners, conservationists, planners, and people in general are concerned about preserving prime land for production of specialty crops and for open space in areas of rapidly expanding population. Such land is an irreplaceable asset in California's future. Its pattern of use must be flexible so it can be shifted to meet changing agricultural demands. With each

(*Continued on p. 18*)

A desirable land use pattern results when soil maps identify prime agricultural land to be kept in crop production while residential construction takes place on the slopes which are less suitable for farming.

Soil Surveys Improve Tax Assessments

Court Upholds Values Based on Kinds of Soil

By W. M. Johnson
Principal Soil Correlator, SCS, Portland, Oreg.

"FARM TAX assessment values based on kind of soil are fair, just, and equitable," a Washington superior court judge recently ruled.

The decision came when a group of Spokane County farmers went to court seeking a return of tax payments made under a new appraisal system based on soil surveys.

The "new look" in land assessment began in 1953. Then tax appraisals were made primarily on land sale prices and visual inspection of stubble. County Assessor Wylie W. Brown asked the Soil Conservation Service to recommend improved methods of assessment through use of soil maps.

The SCS report pointed out that the physical land factors that characterize different soils are relatively stable. When these factors, along with research findings and other technical information, are combined with practical farm experience, they provide a sound basis for establshing relative base values for the various kinds of soil. Erosion and other forms of land deterioration can be taken into account, and land values changed accordingly.

As a result, the county and the SCS agreed on an accelerated soil survey. The county provided $28,000 for the program.

The tax assessor's staff, in cooperation with local farmers, has used the surveys to establish a relative value for each kind of soil in the county. They agreed on an assessed tax base value of $45 an acre for the best Spokane County soil. This is 25 percent of the estimated land value. Other soils were assigned lower values in comparison to the $45 maximum. Because the scale is based on productive capacity rather than current land returns, the careful hardworking farmer is not penalized for his extra ability or foresight.

The assessors realize that dollar values may change as economic conditions change. New assessments can adjust to these factors without changing the relative land values. An equality between land values and tax assessments can therefore be maintained.

Today, 90 percent of the county is assessed under this system. Tax officials feel that most farmers approve; Brown himself believes soil surveys provide "the best method there is to assess farmland. Even if other criteria should be included in the future, the soil survey will still remain the principal basis for assessments." ♦

Iowa Taxmen Use Soil Surveys for Fair Assessment

By Joseph A. Phillips and Raymond I. Dideriksen
Extension Agronomist, Iowa State University, and Assistant State Soil Scientist, SCS, Ames, Iowa

THIRTEEN Iowa counties are now using soil survey information to help in tax assessments, and 12 more counties have indicated a strong interest in the idea. Tax officials say they welcome the use of soil maps as an aid to a fair assessment of farmland.

Adams County, Iowa, is one example of how soil surveys have helped equalize the tax burden.

Eldon Roberts, Adams County assessor, was contacted in 1960 by the Soil Conservation Service, soil conservation district officials, and Iowa State University and advised

Gale Boy, deputy assessor for Spokane County, Wash., looks over a field of Larkin soil assessed at $40 an acre under the old method of visual valuation. Across the road, another piece of property was formerly assessed at $30 an acre. Both properties are now appraised at $32 an acre, based on information from the soil survey.

of the county's recently completed soil survey. With the approval of the county board of supervisors and board of review, Roberts worked out a method of using the soil data for appraisal purposes, stressing the soil's productivity and the market value of the land.

The method

Roberts obtained a set of field soil survey maps, at nominal cost, from the Soil Conservation Service and a crop suitability rating for the area developed by Iowa State University and SCS. The suitability ratings are based on actual crop production and range from a top of 100 for maximum productivity to a low of 5. The assessor then placed a value on each soil type based on past sales records. Thus, each crop suitability rating had a base value set by the county assessor.

The areas of different kinds of soil on each 40-acre tract were measured on the survey field sheets and the amount of each soil type noted. Deductions were made for gullies, ditches, and other features that reduce land value. The acreage of each soil, after deductions, was multiplied by the appraisal factor, and the average value of each 40-acre tract was recorded. The figure was adjusted up or down to compensate for nonland factors such as buildings, access to roads or markets, and the general neighborhood.

Assessment by the new method began in 1961 and was completed in 1964, at a cost of $6,000. It was a "slack time" project for the office. Roberts points out it could be completed in a much shorter period if done on a full-time basis.

The results

Did the re-evaluation make tax assessments in Adams County more equitable?

The total assessed value remained the same. However, there was a wide *range* of assessed value between 40-acre tracts. Productive soils were appraised at about the same value as previously; poor soils often received a lower assessment. In the intermediate soils, there was a high proportion of assessment changes.

Eldon Roberts, Adams County assessor, explains the new method of tax appraisal to two local farmers, Jerry Peckham (left) and Neil Wilmarth (center).

Did landowners in Adams County accept the re-evaluations? By and large, yes.

According to Roberts, 200 farmers out of a total 1,200 asked for explanations of the new rate. However, only 10 farmers appealed for a change.

Roberts says community acceptance was due to an intensive information program carried out by SCS and soil conservation district people, the county extension director, the local vocational agricultural teacher, and others.

Roberts adds that in the beginning he himself evaluated several test farms and, at his request, the county board of supervisors and board of review checked the appraisals on a number of farms in both the high and low group. With their backing, the assessor then extended the procedure to the entire county.

Roberts feels the training he and his staff have received in the use of soil surveys increased their ability to make just and equitable assessments. Farmers were impressed by the detailed information available about their land and pleased that seemingly small differences in soils and land conditions were taken into account.

What about future reappraisal of the land? The basic soils information will not change, but owners can expect some adjustments as land features are altered by various uses.

Taxes on farmland may increase through the years, but Roberts believes that, thanks to soil survey information, Adams County landowners will remain a step ahead in the progress towards tax equalization. ♦

Autumn Olive

People in the East, who want to attract wildlife, conserve soil, beautify odd areas, establish plant barriers, or make ornamental plantings, will find autumn olive a valuable plant. The use of this plant is discussed in detail in "Autumn Olive—for Wildlife and Other Conservation Uses" (USDA Leaflet 458). ♦

The Touch of Beauty

Conservation smooths scars of erosion and clothes barren hills in mantle of green

If you are lucky, as you drive by the Double D Ranch, you may see a spirited stallion racing with the wind.

THE STORY of the princess who kissed the frog and turned him into a handsome prince is no more miraculous than the story of Lafayette County, Miss.

But the magic touch in this case is soil conservation, which in a span of 25 years has laid a mantle of pines and green pastures over the barren and eroded hills.

As an example, let us take the Double D Ranch just west of Oxford—one of the few thoroughbred racehorse ranches in Mississippi.

Here, handsome board fences of treated pine and hardwood enclose lush pastures on which the brood mares graze. And in the upper paddock—with full mane flying—you may see a famous Kentucky stallion racing with the wind.

Rare sights, you say, but think what this land once was!

"It was all woods when I came here," says Morris F. Lynch of Chicago, who bought those 112 acres a few years ago and plans to move down permanently one day. "It was scrub oak—gullies—no fences—one pond—a few small patches of cotton."

"The valleys were so filled with sand and silt that farming operations were impossible," adds Travis King, SCS work unit conservationist who helped Mr. Lynch with a conservation farm plan. The hills had bled white, and the scars were deep on the slopes.

As a cooperator with the Lafayette County Soil Conservation District, Lynch has taken these acres of severely eroded land and turned them into fine pastures. Some of the plants he uses are bahiagrass and crimson clover, fescue and white clover, bermudagrass, and lespedeza. In each pasture is a pond which shimmers blue in the sun. Behind the fences is a fringe of woods.

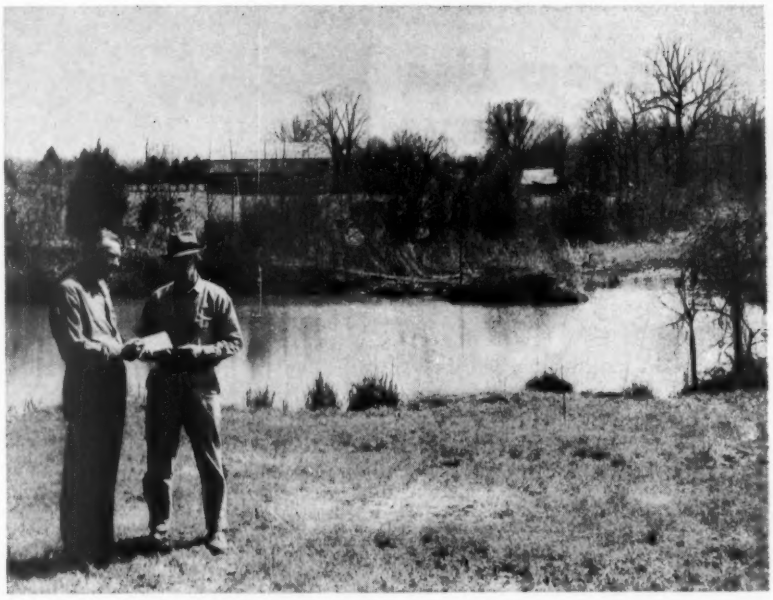
With technical assistance from SCS, Mr. Lynch has also constructed two large desilting basins with pipe outlets to catch the sand and silt that were destroying this valuable bottom land.

Horses like these are new in Mississippi, but the land use changes are not so new. Green hills have been steadily increasing throughout the State since the Soil Conservation Law was enacted in

Pasture improvement (left) has transformed many acres of gullied land into pleasing pasture scenes, like the farm of C. F. Taylor, deputy commissioner of the Lafayette County District. In 1965 more than 400 acres of eroded land were planted to pastures by cooperating farmers. At right, Morris F. Lynch holds a California-bred brood mare, and Double D Ranch Manager R. A. Leister holds her 2-month old colt.

1938. And, although many people may not be consciously aware of it, soil and water conservation has done much to change the landscape into one of beauty.

The pictures on these pages illustrate the new look of the rural landscape in an active soil conservation district. ♦



C. F. Taylor (right) worked out a conservation farm plan for Sunset Hills, a once prosperous antebellum plantation which had "gone to seed." Here is Mr. Taylor with SCS Work Unit Conservationist Travis King beside a farm pond which has been purposefully left surrounded with brush to encourage wildlife.

In the spring of 1965, Cooperator John Leslie smoothed the last 5 acres of his once-desolate farm. When he worked out a conservation farm plan 4 years ago, half of his 163-acre farm looked like this. Using flood prevention funds for critical area treatment, he bulldozed the land, fertilized, and seeded it. Now he has a registered Angus herd on the pastures.

Through the Yazoo-Little Tallahatchie Flood Prevention Program, millions of trees have been planted by the U. S. Forest Service on farms of district cooperators. Now, fine stands of pine are growing in the gullies, beautifying a once-desolate landscape.

This lake—clear blue and fringed with pines—would have been ruined by sediment 4 years ago. Now, Mr. Leslie's family and friends enjoy its beauty from a weekend cottage built of lumber cut off the farm. The casual visitor would find it hard to believe that surrounding land was once marred with gullies too deep to cross.

Engineers Use Soil Surveys for Highways

By W. R. Elder
Soil Scientist, SCS, Temple, Tex.

SOIL SURVEYS can have great value to highway engineers by providing them with accurate, relatively inexpensive information on the soil over which their roads will pass.

As one Texas highway department engineer remarked about a 3-year old road, "That highway would still be in the testing laboratory if we hadn't used soil maps."

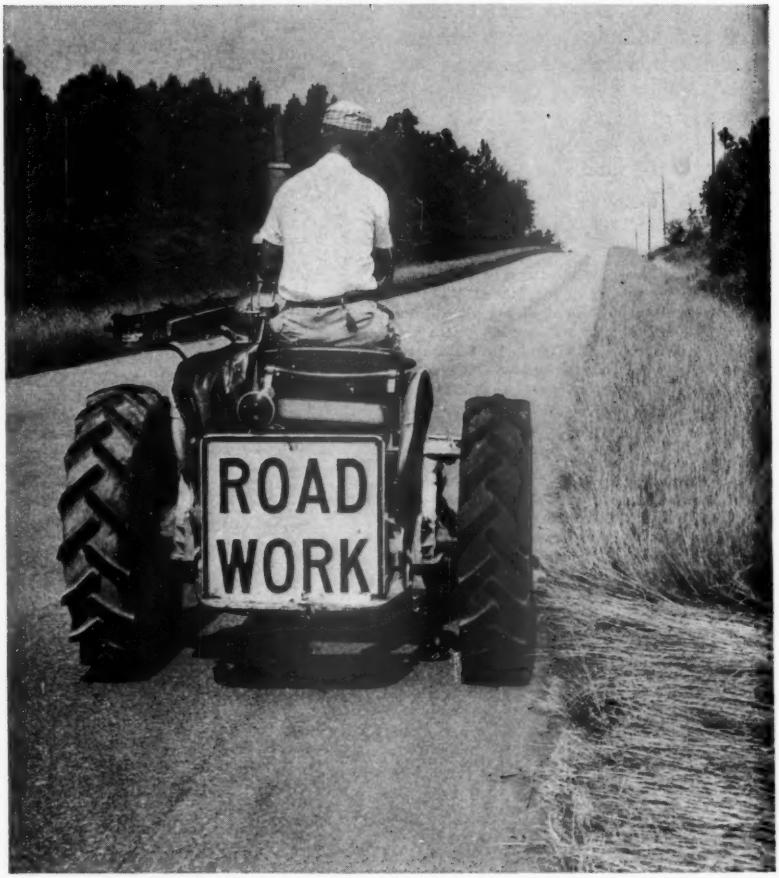
Highway construction is based on soil surveys in the preplanning, planning, and construction phases. In the first stage, a proposed highway can be plotted on a soil map. This will indicate some of the major problems to be expected and, based on previous experience, it will provide the basis for a cost estimate.

In the planning stage, laboratory and other tests are needed to provide the necessary design data for contract specifications.

Saving on samples

But the number of borings and samples needed along a route can be greatly reduced if the engineers have a map showing the extent of each kind of soil. Instead of the usual sample every hundred feet or so, one or a few samples can characterize up to a mile of a single kind of soil, especially if supported by information from earlier samples and experience with the same soil at other locations.

And in the construction phase, soil survey information can help determine the limits of compaction, density, and other requirements for contract work.



Planting a road shoulder with grass, flowers, or trees helps control erosion, cut maintenance costs, and beautify the area. Success of the planting—here bahiagrass—depends on correctly matching kinds of plants to kinds of soils.

Ideally, a highway should have hard rock under the roadbed, which would require neither cuts nor fills. The right-of-way should have fertile soil that will support a good cover of grass or trees. But, unfortunately, stretches of even a few hundred feet that meet these requirements are rare.

Modern highways are precisely designed engineering structures which consist essentially of three components: (1) The underlying soil or geological material, called the subgrade; (2) the base materials of gravel, crushed rock, or lime- or soil-cement-stabilized soils; and (3) the actual road surface or pavement.

The load-bearing characteristics of the soils under a highway determine the thickness and kind of base materials needed. Engineers must decide whether to haul gravel or crushed rock over long distances for the base area, to lime-stabilize clayey soils, or to use soil-cement to strengthen onsite sandy soils and thus reduce the thickness—and therefore the cost—of the crushed rock or gravel base.

Soil maps used for highway construction planning can be the regular soil survey maps or maps made to show strips along the highway right-of-way. Where less detail is required a soil map for an individual county can be used. Where highway departments have built up a file of test data by soil series, generalized county maps have proved very useful and effec-

tive in helping to estimate overall costs and to fill gaps in soils information for which no data are available.

Highway construction uses large amounts of sand, gravel, crushed rock, and bonding clays. These materials must be of high quality and, for cost reasons, should be located as close as possible to the highway under construction. Both soil and geological maps are of great assistance in locating such materials.

Landscape gardeners

There is a final use for soils information in road construction. Highway departments are the largest landscape gardeners in most States. Highway rights-of-way are planted to grass, wildflowers, trees, and ornamentals to make roads safer, to prevent erosion, and to make the surroundings more attractive. Knowledge of the soils, their fertility, and suitable plants for the area are vital for this purpose.

Highways rest on soils. From the first tentative estimate to the finished product, a highway's location, success, cost, materials, and surrounding final appearance all depend on the soils beneath and how well they are interpreted and used. Soil surveys can be a major tool in planning and constructing today's superhighways. ♦

From salt marsh to piny woods...

Louisiana Cattle Drive Enables Rancher to Use Forage in Season

By Thomas N. Shiflet
Range Conservationist, SCS Alexandria, La.

IF, IN south Louisiana, you see a cattle drive in progress, it is not a reincarnation of the "Old West." It's the real thing.

These modern-day cowboys aren't driving them for fun, either. The drive plays an important role in management of the range resources of the area.

One rancher, J. B. Meaux of Cameron Parish, trails more than 450 head 80 miles twice a year. He and his mother, Mrs. Jimmy Meaux, operate a large salt marsh ranch near Creole.

In 1962, he trailed his cattle to the pine woodland area to escape a plague of mosquitoes and other insects that made life unbearable for them. Since that time, he has moved the herd regularly.

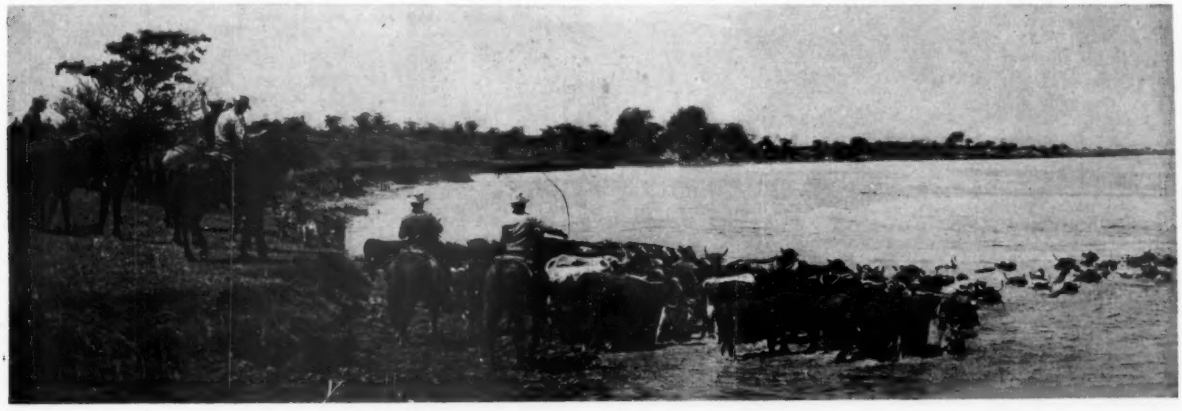
Best for both

This grazing system proved best for both the marsh and woodland grazing resources. The salt marsh is excellent winter range. The slash pine and longleaf pine woodland is best in the spring and summer.

Meaux's system allows complete deferment of the marsh during the summer, assuring an abundance of forage for winter use. His marsh range has improved an average of one condition class since he started the rotation.

Spring and summer use of the woodland takes advantage of its peak forage quality. Salt and mineral supplements, which are not needed on the marsh, are necessary on the woodland range. Cattle are moved before protein content of the forage falls to a low level. The woodland forage is permitted to get good growth before the cattle are put on it. Then it gets rest after they are removed in October and before frost in mid-November.

Most of the grazed woodland is leased from the J. A. Bel Company, a large timber grower. The lumbermen realize that they have a secondary resource in grass. Proper grazing is not harmful to the timber; in fact it benefits the



Cattle start 80-mile trek to winter range with a swim across the wide Calcasieu River.

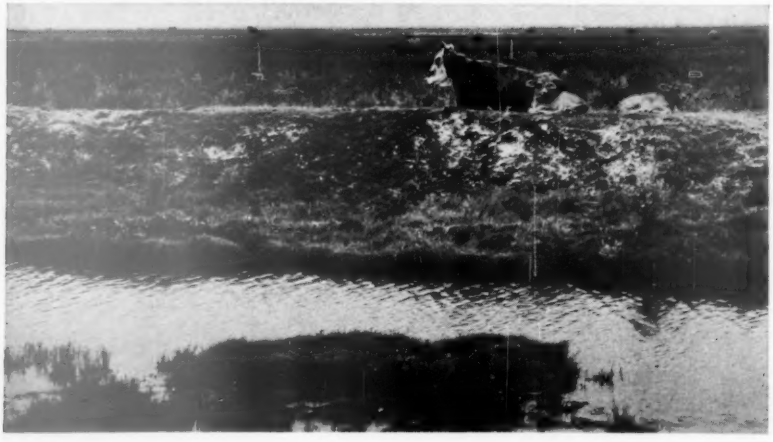
A "cajun" cowboy displays the braided reins that are the badge of the range in the Louisiana marsh country.

woodland by reducing the fire hazard and helping to suppress unwanted hardwoods.

Meaux perfers to drive his cattle rather than haul them by truck. The drive takes about 3 days. The herd swims the Calcasieu River near Lake Charles at a crossing where the river is about one-fifth mile wide. After a few drives, the cows know the way and they swim the river without difficulty.

Meaux lists many advantages of the rotation system over yearlong grazing of the salt marsh. Cows and calves which were once killed by mosquitoes (that's right, killed) during the summer are now saved. He reports that his marketable calf crop has increased by 20 percent and average calf weights by 40 pounds since 1962. He has been able to increase his cow herd without overgrazing either range.

At summer's end, cattle are rounded up from the woodlands and headed back to the marsh.



A cow and calves rest on a cattle walkway, one of a series of low ridges of earth thrown up at intervals through the marsh to give firm footing and distribute grazing evenly.

Both units have conservation plans developed in cooperation with the local soil and water conservation district. Meaux has been cooperating with the Gulf Coast District on the marsh ranch since 1950. A plan was developed on the woodland tract with the Calcasieu District in 1963. Both Meaux and the Bel Company are participating in this plan.

Meaux has found great difference in grazing the two areas. Proper use on the salt marsh requires 4 to 5 acres per animal unit equivalent year long, compared to 15 to 20 acres on the woodland.

Grazing distribution is a prob-

lem on both ranges, but ways of achieving it are different. Cattle walkways are used on the marsh. On the woodland, strategic location of water and of salt and mineral feeders keep the stock properly scattered. Cattle must have salt and mineral when grazing woodland forage, but they ignore it on the marsh because of salt on the vegetation and the quality of forage.

Meaux' grazing program is aimed to get the best management for his livestock and grazing resources. The annual cattle drive is just a practical way to match grazing use to seasonal forage production for year-round livestock operation. ♦

Plastic Netting Tested on Dunes

PLASTIC NETTING is being tested as a new material to stabilize the thin line of sand dunes that protect New Jersey's multimillion dollar coastal recreation areas from surf and wind.

Comparisons of sand traps made of the new polyethylene netting with the old-style wood slat fences are being made by the Soil Conservation Service and the State of New Jersey at Island Beach State Park.

In a recent test, a 1,000-foot-long section of the netting was strung on posts set at 7-foot intervals to form a 4-foot high barrier along the shore. A 200-foot section of wood fence was installed nearby.

Sand accumulated along the plastic netting to a height of 4 feet within 3 to 4 months. At the end of a year, the netting was still in good condition.

By contrast, the wood fence collected only 2 feet of sand during the same period.

The tests showed that 5/8-inch mesh netting was the most efficient size for trapping sand. The plastic fence could be erected at the rate of 100 feet per man-hour, three times as fast as wood-slat fencing. In addition, the plastic netting weighs only 13 pounds a 100 feet, compared to 100 pounds for wood slats, and it is easier to store, transport, and unroll.

A 4-foot-high plastic netting fence was covered to the top with sand in 3 months.

The SCS and manufacturer are pleased with the experiment, and plan to make a larger test on a Long Island, N. Y., beach in the near future.

Considering the results to date, it would appear that plastic netting might have other conservation uses, such as for temporary windbreaks on muck land, trapping snow on ski trails, and protecting newly seeded areas from wind erosion.—DONALD G. BURBANK, *State Soil Conservationist, SCS, New Brunswick, N. J.* ♦

Water is Theme of SCSA 21st Meeting

"Water and America's Future" is the theme of the 21st annual meeting of the Soil Conservation Society of America at Albuquerque, N. Mex., on August 14 to 17.

Among the speakers will be Secretary of the Interior Stewart Udall; Gladwin Young, associate administrator of the Soil Conservation Service; Henry Caulfield, executive director of the National Water Resources Council; Robert D. Weiger, chief of the Department of Health, Education, and Welfare's Office of Pesticides; and New Mexico Governor Jack Campbell.

Thirty-eight papers will be presented in technical meetings of the convention, and winners of 15 conservation scholarships and 6 National Merit Awards in Conservation will be announced.

The 11,000-member Soil Conservation Society of America was organized in 1943 to "advance the science and art of good land use." The organization publishes the *Journal of Soil and Water Conservation.* ♦

Land Planning

(*Continued from p. 9*)

new foundation, a little more of the pattern is set in concrete.

The California Conservation Needs Inventory showed that in 1960 there were 475,000 acres of class I and II (prime land) used for agriculture in the nine Bay Area counties. This report estimated that 155,000 of these acres would be urbanized by 1975. Projections are that essentially all of the remaining 320,000 acres of prime agricultural land will be urbanized by the year 2005 unless present trends are changed.

The California Land Conservation Act of 1965 provides for preserving prime agricultural land by continuing to tax designated qualifying areas (preserves) on an agricultural base if the landowner wishes to avail himself of the provisions of the act. Prime agricultural land is defined as land in capability classes I and II or land that has produced $200 or more an acre gross agricultural income in 3 of the last 5 years. The general soil and capability maps are being used to help identify larger areas that qualify for such special treatment.

Throughout the State trends toward broader land use planning have emphasized the need for greater attention to interpretive soil maps. Conservationists and planners are well aware that land resources vary widely in their capabilities for specific uses, acres are not interchangeable, and specialty-crop land is scarce. Location, climate, and soil properties must therefore enter into calculations and plans for orderly growth and development of communities, counties, regions, and the State.

We are beginning to appreciate the meaning of "Under all is the land." The basic principles of soil science are similar for farm and nonfarm uses; the difference is in number and kinds of soil interpretations. The same properties and qualities of depth, texture, permeability, fertility, and drainage are important for planning of parks, roads, and developing urban areas as well as for their more familiar use in agriculture.

Soil maps and interpretations are essential in planning all land uses. They should be at hand when broad land-development patterns are being formulated.

General soil maps, of course, are no substitute for detailed surveys or onsite examinations. Because of the complexity of soils as they occur in nature, any area shown on a general map may contain smaller areas that differ from the prevailing characteristics of the area. The interpretations, therefore, apply only to broad areas and not to specific sites.

General soil maps are prepared largely by selection of information from completed detailed surveys. Unmapped areas are covered by reconnaissance field studies to serve as a guide until detailed surveys are available. Line maps at a scale of 1 inch equals 2 miles are used as a base. The general map of a representative county has about 25 soil separations based primarily on differences that influence soil interpretations for a variety of purposes.

Information on general soil maps must be explained and interpreted for the needs of many potential uses. For this, single-purpose interpretive maps are colored to show three or more classes of soil use potentials and limitations for the selected purpose. Such interpretations may include: (1) Agricultural land capability, (2) range sites, (3) woodland suitability groups, (4) soil limitations for various recreational uses, (5) hydrologic soil groups, (6) soil erosion hazards, (7) soil shrink-swell behavior, (8) ratings for foundations, (9) soil limitations for septic tank filter fields, and (10) pipe corrosivity, and others.

The single-purpose maps follow the standard color pattern for land capability classes: Green, slight limitation; yellow, moderate; red, severe; and blue, very severe. Specific criteria for mutually exclusive categories have been developed for each interpretation.

Land use objectives

The philosophy underlying this type of land use planning needs to be expanded and broadened if prime farmland is to be maintained as a vital part of the California of the future. Support is growing in the State for the type of planning which seeks the best relationship between resources, economic pressures, and social needs. Such desirable land use planning will:

(1) Maintain prime agricultural land for farming and open space. This will mean California's valuable speciality crops can continue to be grown. This will also provide the green spaces and open countryside we want and need for ourselves and our children.

(2) Route highways and other public facilities in conformance with good land use patterns.

(3) Guide urban development so good farmlands are used for crops while the scenic, flood-free terraces, benches, and rolling hills are used for housing developments.

(4) Place parks and wildlife where water, scenery, and soils are better adapted to recreational uses than to farming or housing.

(5) Use the steeper and more shallow soils for pasture, range, and woodlands.

Fundamental to all of these plans, of course, is a good knowledge of the soils involved.

The challenge to all landowners, citizens, planners, and government agencies is to project and develop land use patterns that are in harmony with the soils and landscape —that will provide a place for farms, factories, towns, and open spaces in proper balance with society's needs.

Land use plans for tomorrow and the distant future are needed

before today becomes yesterday, and we belatedly realize that another opportunity was missed in our rapidly changing times. Single-purpose interpretive soil maps clearly present the suitability of the land for specific purposes, general soil maps for broad framework planning, and detailed maps for field, farm, and tract planning. They are proving helpful in evaluating alternative land uses to arrive at a desirable pattern for future development. ♦

Water and Grass Farmer's Aim

PARALLEL TERRACES, grassed waterways, field border plantings, and grass rotations help put into reality a plan of an Alabama farmer to have all water leaving his farm run through grass.

It all began back in 1950 when E. F. Washburn, whose 110-acre farm lies atop Sand Mountain near Sardis, became a cooperator with the Etowah County Soil Conservation District. Starting with 60 acres and later adding more, he developed a complete soil and water conservation plan with SCS help and received cost-shared assistance through the Agricultural Stabilization and Conservation Service.

Washburn built parallel terraces and waterways and established conservation cropping systems. He planted Kentucky 31 fescue grass, keeping it on the land from 3 to 5 years, and rotating it with row crops.

While the land is in grass, he uses it for grazing and hay. Excess from his pasture and cuttings from his waterways provide all the hay Washburn needs. One year he was able to harvest more than 900 bales.

When a field is in row crops, he manages the residues to protect the soil and increase its moisture-holding capacity. Each fall he plants vetch for a winter cover crop.

E. F. Washburn has been chosen by the board of supervisor's as an adviser in the Etowah County District, as an ASCS County Committeeman, and in 1961 he received the Goodyear "Outstanding Conservation Farmer" Award.

His conservation system boosts farming efficiency, Mr. Washburn says. In addition to improving and conserving the soil, it shortens the time required to cultivate row crops, eliminates most short rows and turn rows, and the waterways and borders provide turning room for machinery. ♦

E. F. Washburn points to a newly seeded waterway that will drain into small pond in background. Sam Burnette, Etowah County SCD supervisor, and A. T. Webb, SCS work unit conservationist, look on.

A Man and a Project Get Watershed Awards

A manufacturer's agricultural representative who recognized the potentials of the small watershed program in the mid-1950's and made himself an expert in helping communities organize and plan for action was rewarded with designation as "Watershed Man of the Year" at the 1966 National Watershed Congress in Oklahoma City.

Elmer L. Smith of Caterpillar Tractor Company of Peoria, Ill., was cited for his contribution to progress through his advice on publications, displays, motion pictures, and slide presentations, and through counseling with his own organization and others on advertising themes promoting watershed protection and flood prevention.

The Congress' "Watershed of the Year" plaque went to the American-Dry Creek Project in north central Utah for its success in marshaling a broad cross section of community interests to reduce heavy flood damages and improve the resources of the watershed. ♦

Roads Disturb Soils

Thousands of miles of freeway, highway, country road, and forest access roads are built in the United States each year. Nearly every foot of this construction is in a watershed, and except for overpasses, viaducts, and bridges, most of it involves soil disturbance. ♦

Fee Fishing Pays in Prime Free Fishing Region

"FEE" FISHING on the Olympic Peninsula in Clallam County, Wash., just minutes from free fishing! Bunk? John Elwick and his wife Lila don't think so.

Three years ago the Elwicks, with assistance from the Soil Conservation Service, built a dam across Jimmy-Come-Lately Creek, which measured 15 feet high and 150 feet long. It formed a 410-foot long 2-acre lake.

In the spring of 1963, John stocked the lake with 6,000 rainbow trout fry and offered them supplemental food. Encouraged by the results (6- to 8-inch trout by the end of the summer) he purchased another 16,000 fry in 1964 for rearing in a 20 x 50 x 4-foot flow-through pond built below the dam and supplied with water from the lake.

Here fish were fed and cared for until they were 6 to 8 inches long. They were then moved to the fishing pond or sold to licensed pond owners for stocking.

John and Lila opened their fish pond to fishing on Labor Day, 1964. By June 1, 1965, the end of the off season, they had taken in $750, most of it from "fee" fishing. A small part came from selling fish to other pond owners for stocking. By Labor Day, 1965, they had received $1,000 from fishing alone.

Customers are mostly elderly people who can no longer "fight the brush" or handle a boat, and grandparents with their small fry. Young couples with small children have begun to frequent the enterprise.

"Some customers come again and again," says Mrs. Elwick.

"Adults don't say too much, but children—you should hear them whoop and holler! Parents enjoy themselves too, but aren't as exuberant as the kids."

John and Lila Elwick's home overlooks their fish pond with the Olympic National Forest in the background. Two customers (r.) try their luck in the placid water.

Customers are charged by the size of the fish: 8 inches and under, 25 cents; 8 to 10 inches, 50 cents; 10 to 12 inches, 85 cents; and 15 inches and over, $1.50.

Fishermen here don't need a license, and there is no limit beyond the pocketbook.

The Elwicks furnish poles and bait and even clean the catch. One couple came to catch a few fish for dinner and wound up with 50 because they didn't want to stop fishing.

In 1952, the Elwicks bought their 80-acre farm, southeast of Sequim in a valley nestled below the majestic fir-clad Olympic Mountains.

It was largely brush and stumps, with a few acres of cleared land. Most of the land is cleared now and seeded to hay and pasture. Seven acres are irrigated from the fish pond in accordance with a conservation farm plan.

John and Lila have a small but growing beef herd. When John, a journeyman steamfitter, is away, Lila looks after their 2,000 hen laying flock, feeds the fish, and waits on the customers.

As yet the fish pond makes a minor contribution to their income. But the Elwicks are looking forward to the day when they can take their own eggs and hatch their own fish. When that day comes, John can lay down his tools and stay on the farm.—ALLEN D. BUSENBARK, *Work Unit Conservationist, SCS, Port Angeles, Wash.* ♦

Neighborhood Youth Corps

Some 894 boys in the Neighborhood Youth Corps worked during the summer of 1965 on survey crews, flood restoration, recreation projects, and as aids to professional personnel in soil conservation districts. ♦

CONSERVATION PROFILE

Ralph L. Easterbrook

Massachusetts

Longtime conservationist looks to future needs

"MR. CONSERVATION of Massachusetts" might well be another name for Ralph L. Easterbrook of Dudley, who has served for 19 years as chairman of the board of supervisors of the Southern Worcester Conservation District.

One of his first undertakings in that position was to call together interested farmers to meet at his farmhouse's sun porch. Today some of the early Soil Conservation Service people say, "It was his guiding hand that helped us gain early acceptance of our technical work in the 26 towns of the district." Mr. Easterbrook was always willing to discuss conservation work with people from all walks of life.

On his own diversified dairy, fruit, and turkey farm, he held demonstration meetings to encourage neighbors to establish conservation practices. He constructed three ponds, removed stone walls, and constructed waterways on his own farm. Today he proudly points to his well-kept buildings and farmland, which is now under the active operation of his son.

In his 19 years as board chairman, Mr. Easterbrook guided the district program at Farmers' Field Days, which attracted as many as 15,000 people. He helped direct the annual District Tree Program which distributed more than 200,000 tree seedlings.

When the Watershed Protection and Flood Prevention Act became law, he was a staunch supporter of projects as a means of protecting towns from such floods as hit Massachusetts in 1936, 1938, and 1955. His efforts contributed to having the district cosponsor the Upper Quahoag River Watershed Project.

Ralph Easterbrook was the first secretary-treasurer of the Massachusetts Association of Conservation Districts. He has been active in county and State Farm Bureau work, a member of the county ACP committee, a supporter of county extension work, and, in his own community, a selectman and a member of the finance and zoning boards.

"Supervisor Emeritus" is the title bestowed on Mr. Easterbrook by fellow conservationists of his district "for his leadership in promoting good land use."

At a recent district supervisors' meeting, he said "There is more work to be done in assisting towns with public recreation areas, school sites, and seeing that housing developments use the land within their capabilities."

"Mr. Conservation," who is now 76, is encouraging the conservation district board to develop new programs to assist town conservation commissions and other town officials, as well as farmers, plan for the future use of soil and water resources. ♦

Urban Environment Is Educators' Topic

"CONSERVATION EDUCATION in Urban Environments" is the banner under which members of the Conservation Education Association will gather for their 13th annual conference, August 14 to 18, on the campus of Bridgewater State College, Bridgewater, Mass.

This year, conferees will give special attention to techniques for teaching conservation in the urban environment. They also will consider from the viewpoint of education several aspects of quality of environment.

Wilson F. Clark, chairman of the Division of Science and Mathematics at Eastern Montana College, is president of the association. Among the objectives of the organization are the following: (1) To develop effective conservation programs in schools, and with adult and youth groups; (2) to encourage the training of teachers in conservation concepts, practices, teaching methods, and techniques; (3) to provide leadership in forming conservation education policies; and (4) to stimulate the production and use of accurate and understandable conservation teaching aids.

Among the members of CEA are teachers, curriculum specialists, school administrators, Federal, State, and local resource agency personnel, and private conservation organization representatives as well as private citizens with an interest in wise use of natural resources. ♦

Land Use Information, a Critical Survey of U. S. Statistics Including Possibilities for Greater Uniformity. By Marion Clawson with Charles L. Stewart. *1965. Resources for the Future, Inc., Washington, D. C. (Johns Hopkins Press, Baltimore). 402 pp. $6.*

The work of a distinguished committee of 30 persons sponsored by Resources for the Future provides the basis for this book.

The title may mislead readers to expect to find both information and statistics about land use. They will find neither.

The first half of the books sets forth some definitions and concepts in search of an "ideal" set of land use data. However, the "ideal" seemed to elude the committee so that in the last chapter they were willing to settle for "an attainable system of land data" that would at least "be built on logical concepts."

The most useful part of the book to those who must depend upon the "hodge-podge" of existing data is found in the appendix.

Appendix A gives a particularly interesting and usable listing of dates and events in United States land history that affect needs for land use information. Other chapters in the appendix describe the kinds of data collected by the Bureau of Public Roads, Forest Service, Soil Conservation Service, Economic Research Service, Statistical Reporting Service, Bureau of the Census, and Housing and Home Finance Agency.

Nobody is likely to disagree with the case Clawson and Stewart make for more and better land use data. Even though an exact prescription for an ideal system is not made, any serious efforts toward amendments will find some valuable spadework already done. —Gladwin E. Young, *Associate Administrator, SCS.*

New Publications

Has the United States Enough Water? By A. M. Piper. *1965. U. S. Dept. of Int., Geol. Surv. Water-Supply Paper 1797. 27 pp.; 3 maps in pocket.* Building on previous studies, the author carries calculations of water supply and demand to more concrete and local answers than have been available previously.

The results are finally expressed in terms of million gallons a day per square mile. Three large maps show average precipitation, surplus or deficiency of precipitation compared to potential evapotranspiration and stream runoff for the 48 States, and tables summarize data for 19 drainage regions similar to those used by the U. S. Senate Select Committee on National Water Resources.

"With an appreciation that he may be oversimplifying, the writer ventures that the United States can be assured of sufficient water of acceptable quality for essential needs within the early forseeable future, provided that it (1) informs itself, much more searchingly than it has thus far, in preparation for the decisions that can lead to prudent and rational management of all its natural water supplies; (2) is not deluded into expecting a simple panacea for water-supply stringencies that are emerging; (3) finds courage for compromise among potentially competitive uses for water; and (4) accepts and can absorb a considerable cost for new water-management works, of which a substantial part will need be bold in scale and novel in purpose."

Development of a Procedure for Estimating the Effects of Land and Watershed Treatment on Streamflow. By A. L. Sharp, A. E. Gibbs, and W. J. Owen. *1966. USDA Tech. Bul. 1352. 57 pp., charts and maps. $0.55.* This publication reports the results of a 5-year study in the Great Plains area by an interagency "work group" headquartered at Lincoln, Nebr.

"Overall, the many investigations carried out demonstrated that a procedure, based only on statistically significant results obtained from studies of river basins and research watersheds, could not be developed. Yet, the evidence on the whole indicated that conservation measures such as contouring did affect onsite runoff, and it is self-evident that, in drier areas, storage in ponds and reservoirs, drainage of potholes, and irrigation affect onsite water yield. Since a procedure could not be demonstrated statistically, a rational procedure was developed."

Although the report is concerned mainly with methodolgy, it does give interesting insights into the effects of various conservation treatments on streamflow.

Geography of Coastal Deserts. By Peveril Meigs. *1966. UNESCO, Paris. 140 pp., 14 maps. $6.50. Distributed by UNESCO Publications Center, New York.* Report No. 27 of UNESCO's Arid Zone Research Program treats the "geographic potentiality" of coastal deserts of the world, the nearest to the United States being in northwest Mexico. Geographic potentiality "is construed as meaning the total natural environment and the possible uses to which it can be put."

Fish, Wildlife, and Pesticides. By U. S. Fish and Wildlife Service. *1966. U. S. Dept. of Int., Washington, D. C. 12 pp., illus. $0.10.* A general statement of the Fish and Wildlife Service's position on the use of pesticides and a layman's summary of the agency's research on the effects of pesticides on wildlife.

Handbook of Outdoor Recreation Enterprises in Rural Areas. By Robert S. Crites. *(1966). USDA, Farmers Home Administration. 122 pp. $0.65.* A compilation of information guidelines and examples prepared primarily for FHA employees advising potential operators of income-producing recreation enterprises.

Urban Sediment Can Be Controlled. *1966. Interstate Commission on the Potomac River Basin, Washington, D. C. 40 pp., illus.* Proceedings of the winter public meeting, College Park, Md., February 17-18, includes a variety of papers on the problem and its treatment.

Ground-Water Level in the United States 1959-63, Southeastern States. By O. M. Hackett. *1965. U. S. Dept. Int., Geol. Surv. Water-Supply Paper 1802. 265 pp. $1.* Tables of data.

Camping. By U. S. Forest Service. *Revised 1966. USDA PA-502. 16 pp., illus. $0.20.* Describes the resources of the National Forests for camping, with hints on using them.

From the Administrator:

Soil Surveys for Nonfarm Uses

TO ANYONE living near a metropolitan area, the growth of suburbs, shopping centers, access roads, and industrial developments is an obvious and growing fact.

Highways, high-rises, and high prices are hitting the surrounding countryside with explosive impact as, each year, some 1⅓ million acres of our land disappears from fields and pastures to reappear blacktopped and cemented over, chopped into home lots, or veined with the vast underground of pipes, sewers, and cables that mark an industrial society.

This nonfarm use of the land has a direct effect on our soil survey work.

SCS has the responsibility for assisting with soil and water conservation problems wherever they arise.

We have been making soil maps for farm use for more than 60 years. And now, as some of our farmland goes to town, our soil surveys must follow. Because, whether the land is used for corn or construction, it is still necessary to know the kinds of soil and their behavior under different treatments in order that land may be wisely used.

Nonfarm people are realizing this more and more. Their requests to us for soil surveys have more than doubled each year during the past several years. These nonfarm users often report benefits in excess of several thousand dollars an acre. In some instances, they claim, the cost of entire buildings has been saved through the use of soil surveys to locate the proper land for their purposes.

There are many examples of nonfarm uses of soils information in this issue of *Soil Conservation*. I am particularly interested to note that these examples span a range from the complex land use planning problems of the San Francisco Bay region, with its millions of people, to the single purpose of tax assessment in a rural county.

Soil surveys benefit areas of rapid population expansion in many ways. The same principles of soil use and management that lie back of agricultural improvements of the past two decades can be applied as well to the rural-urban space being filled by our increasing population.

What we have learned about selecting soils for farming and forestry can be applied equally well to selecting soils for housing, highways, golf courses, and for other uses. There is no need to put houses where they may slide downhill, settle and crack, or be flooded; or where they cannot be beautified with growing plants.

Soil surveys are a valuable tool for nonfarm land use planners, but they are not the only tool, of course. Surveys do not replace the need for specific onsite testing, once a particular building site is under consideration.

On any map of practical scale, any delineation is likely to include minor areas that do not conform to the described soils, so the user needs to verify important features on the spot before proceeding with costly improvements. In addition, soil descriptions normally are specific only to depths of 4 or 5 feet, so further study is necessary for large structures that might be affected by conditions below that depth.

But, surveys are a basic first step and will often cut down on the cost of later steps in planning and design.

The use of soil surveys for nonfarm purposes is not limited to urban locations, and the benefits do not go exclusively to city people. Much construction of highways, public buildings, residences, and industrial areas takes place in rural settings. Actually, the interactions between rural and urban interests today are so many and so intimate that the old distinctions between town and country are no longer valid.

By using soil surveys, both as a guide for farming and for nonfarm land uses, we have an opportunity to maintain a strong agriculture and to plan and develop new living space with the advantages of both country and city.

Within this space we can have fields, forests, parks, water surfaces, and wildlife areas. At the same time, we can allow enough density of homes to support efficient schools, shopping areas, clubs, and other facilities of modern life. With this kind of planning by local responsibile officials, both country families and city families can have a better place to live.

We are a fortunate country. For the present we have enough land, and enough *kinds* of soil, for all of our many needs—agricultural, industrial, and recreational. But we must use our land wisely, and increasingly that "we" means urban people.

Once land is excavated for building, or blacktopped over for highways, its alternate uses for the foreseeable future have been sharply curtailed or rendered nonexistent. So, mistakes in converting rural land to urban uses are particularly costly.

Land continues to be our basic natural resource. We must continue our planning for all its many uses from the ground up, with soil surveys.

D. A. WILLIAMS

SC OCT 46129
UNIVERSITY MICROFILMS
SERIALS SECTION
313 NORTH FIRST ST
ANN ARBOR, MICH

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